

# Work Order ID 73806

Thursday, September 15, 2011 3:57:39 PM



Page 1

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: *H*

Date: 11-09-15

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D350-748-241

F

*MLJ 12/06/28*

100

0.00



DOCUMENT CONTROL

*SP*

DC

Memo

0.00

Document Control

Photocopy bluefile & type labels per PPPD350-748-201 CHG002

*W 12 06 28*

110

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT

*UP 12.06.28*

*\*\*\* under bent by .250" nominal per spec*

*DD 12-6-7*

120

0.00



QC15- Crosstube Dimensional Check

*QC*

Memo

0.00

Quality Control

*Q 8 12 06 28*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 73806

Thursday, September 15, 2011 3:57:39 PM

Page 2

Item ID: D350-748-201

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00

Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

125

0.00

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

\*\*\*Stress relief\*\*\*

Heat treat crosstube as per QSI010 4.3

Temp: \_\_\_\_\_

Start time: \_\_\_\_\_

Finish time: \_\_\_\_\_

N/A see pg. 7

127

QC5- Inspect part completeness to step on W/O

0.00

QC

Memo

0.00

Quality Control

POSITIVE RECALL  
EFFECTIVE 12.06.07 AUTH JP  
RELEASED TURN DIMS DATE 12/6/09

perch.

issue P/O to meter P/O: 17519

CX/12/06/25 ①

rec'd.

rec'd + inspect  
attached CFC

*[Signature]*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 73806**

Page 3

Thursday, September 15, 2011 3:57:39 PM

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

130

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,  
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPSS on the interior of tube  
Batch: \_\_\_\_\_

WLA u 12-6-11

140

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

Quality Control

**POSITIVE RECALL**

EFFECTIVE 12/6/11 AUTH W

RELEASED W DATE 12/6/21

0

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 73806

Thursday, September 15, 2011 3:57:39 PM



Page 4

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

150

Outsource process-Cadplate per QSI017 4.1.9.1

0.00



Outsource3

Memo

0.00

Outsource process - Cad plate

Issue P/O: 17184  
Stress relief at 375° for 5 hours  
Magnetic Particle Inspect per ASTM E1444  
Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2  
Embrittle relief at 375° for 8 hours, Chromate Treat  
Possible Supplier: Southwest United Industries  
Ensure Certificate of Conformity is attached

CX 12/06/11 ①

160

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformity is attached

★ SEE W/O CHG ATTACHED

Pep/8/11 ①  
C/4/21 ①

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

W 12 06 22

Purch.

P/O: 17282 NDT

CX 12/06/22

rec'd

attached c/c

Pep/8/22 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
11.10.13	161	LOAD TUBE TO 3000 <sup>lb</sup> FOR 1 MINUTE REF D.S. EMAIL		12/6/14		12/6/14	12/6/14	
11.10.13	162	NOT TUBE						

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date &amp; initial all entries

**Work Order ID 73806**

Page 5

Thursday, September 15, 2011 3:57:39 PM

Item ID: D350-748-201

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  SprayPaint Spray Painting	SprayPaint  Memo 1-Prime inside crosstube as per QSI 005 4.2 2-Paint Outside of Tube as per Dart QSI 005 4.2	0.00  0.00				AR	12	6 - 22	
190  QC Quality Control	QC14- Inspect Spray Paint  Memo Then, Wrap in plastic bag to protect from scratches	0.00  0.00				1			12 08 24
200  Crosstubes Crosstubes	Crosstubes  Memo 1-Install Ground wire Insert, then insert screw and washer 2-Install Abrasion strips as per Dwg D350-748-241 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-241, Torque to 60-80 IN-LBS	0.00  0.00				1			12 08 24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

100-443887-1000

Page 6

**Accept**

1  
 2  
 3  
 4  
 5  
 6  
 7  
 8  
 9  
 10  
 11  
 12  
 13  
 14  
 15  
 16  
 17  
 18  
 19  
 20  
 21  
 22  
 23  
 24  
 25  
 26  
 27  
 28  
 29  
 30  
 31  
 32  
 33  
 34  
 35  
 36  
 37  
 38  
 39  
 40  
 41  
 42  
 43  
 44  
 45  
 46  
 47  
 48  
 49  
 50  
 51  
 52  
 53  
 54  
 55  
 56  
 57  
 58  
 59  
 60  
 61  
 62  
 63  
 64  
 65  
 66  
 67  
 68  
 69  
 70  
 71  
 72  
 73  
 74  
 75  
 76  
 77  
 78  
 79  
 80  
 81  
 82  
 83  
 84  
 85  
 86  
 87  
 88  
 89  
 90  
 91  
 92  
 93  
 94  
 95  
 96  
 97  
 98  
 99  
 100  
 101  
 102  
 103  
 104  
 105  
 106  
 107  
 108  
 109  
 110  
 111  
 112  
 113  
 114  
 115  
 116  
 117  
 118  
 119  
 120  
 121  
 122  
 123  
 124  
 125  
 126  
 127  
 128  
 129  
 130  
 131  
 132  
 133  
 134  
 135  
 136  
 137  
 138  
 139  
 140  
 141  
 142  
 143  
 144  
 145  
 146  
 147  
 148  
 149  
 150  
 151  
 152  
 153  
 154  
 155  
 156  
 157  
 158  
 159  
 160  
 161  
 162  
 163  
 164  
 165  
 166  
 167  
 168  
 169  
 170  
 171  
 172  
 173  
 174  
 175  
 176  
 177  
 178  
 179  
 180  
 181  
 182  
 183  
 184  
 185  
 186  
 187  
 188  
 189  
 190  
 191  
 192  
 193  
 194  
 195  
 196  
 197  
 198  
 199  
 200  
 201  
 202  
 203  
 204  
 205  
 206  
 207  
 208  
 209  
 210  
 211  
 212  
 213  
 214  
 215  
 216  
 217  
 218  
 219  
 220  
 221  
 222  
 223  
 224  
 225  
 226  
 227  
 228  
 229  
 230  
 231  
 232  
 233  
 234  
 235  
 236  
 237  
 238  
 239  
 240  
 241  
 242  
 243  
 244  
 245  
 246  
 247  
 248  
 249  
 250  
 251  
 252  
 253  
 254  
 255  
 256  
 257  
 258  
 259  
 260  
 261  
 262  
 263  
 264  
 265  
 266  
 267  
 268  
 269  
 270  
 271  
 272  
 273  
 274  
 275  
 276  
 277  
 278  
 279  
 280  
 281  
 282  
 283  
 284  
 285  
 286  
 287  
 288  
 289  
 290  
 291  
 292  
 293  
 294  
 295  
 296  
 297  
 298  
 299  
 300  
 301  
 302  
 303  
 304  
 305  
 306  
 307  
 308  
 309  
 310  
 311  
 312  
 313  
 314  
 315  
 316  
 317  
 318  
 319  
 320  
 321  
 322  
 323  
 324  
 325  
 326  
 327  
 328  
 329  
 330  
 331  
 332  
 333  
 334  
 335  
 336  
 337  
 338  
 339  
 340  
 341  
 342  
 343  
 344  
 345  
 346  
 347  
 348  
 349  
 350  
 351  
 352  
 353  
 354  
 355  
 356  
 357  
 358  
 359  
 360  
 361  
 362  
 363  
 364  
 365  
 366  
 367  
 368  
 369  
 370  
 371  
 372  
 373  
 374  
 375  
 376  
 377  
 378  
 379  
 380  
 381  
 382  
 383  
 384  
 385  
 386  
 387  
 388  
 389  
 390  
 391  
 392  
 393  
 394  
 395  
 396  
 397  
 398  
 399  
 400  
 401  
 402  
 403  
 404  
 405  
 406  
 407  
 408  
 409  
 410  
 411  
 412  
 413  
 414  
 415  
 416  
 417  
 418  
 419  
 420  
 421  
 422  
 423  
 424  
 425  
 426  
 427  
 428  
 429  
 430  
 431  
 432  
 433  
 434  
 435  
 436  
 437  
 438  
 439  
 440  
 441  
 442  
 443  
 444  
 445  
 446  
 447  
 448  
 449  
 450  
 451  
 452  
 453  
 454  
 455  
 456  
 457  
 458  
 459  
 460  
 461  
 462  
 463  
 464  
 465  
 466  
 467  
 468  
 469  
 470  
 471  
 472  
 473  
 474  
 475  
 476  
 477  
 478  
 479  
 480  
 481  
 482  
 483  
 484  
 485  
 486  
 487  
 488  
 489  
 490  
 491  
 492  
 493  
 494  
 495  
 496  
 497  
 498  
 499  
 500  
 501  
 502  
 503  
 504  
 505  
 506  
 507  
 508  
 509  
 510  
 511  
 512  
 513  
 514  
 515  
 516  
 517  
 518  
 519  
 520  
 521  
 522  
 523  
 524  
 525

**Setup Start**[illegible]

**Stop**

[illegible]

**Start Date:** 9/15/2011      **Start Qty:** 1.00

**Cust Item ID:**

**Required Date:** 10/6/2011      **Req'd Qty:** 1.00

**RESEARCH DESIGN AND METHODS**

**Customer:**

**Reference:**

Run Start

[illegible]

**Approvals:** \_\_\_\_\_ **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Stop**



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Date:

**SPC (Y/N):**

Date:

## Insp. Stamp

0.00

\_\_\_\_\_

QC

## Memo

0.00

## Quality Control

① B 12 Oct. 25

0.00

\_\_\_\_\_

### Packaging

## Memo

0.00

## Packaging

10/6/28

0.00

[illegible]

QC

## Memo

0.00

## Quality Control

1. 12 06 25

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 73806**

Thursday, September 15, 2011 3:57:39 PM

Page 7

Item ID: D350-748-201

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011 Start Qty: 1.00

Cust Item ID:

Required Date: 10/6/2011 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

240

0.00



Packaging

Packaging

Memo

0.00

Identify and pack for shipping as per PPPD350-748-201

Location:

PPP Rev. B

250

0.00



QC21- Final Inspection - Work Order Release

QC

Memo

Quality Control

**POSITIVE RECALL**  
EFFECTIVE 12/6/21 AUTH UP  
RELEASED \_\_\_\_\_ DATE \_\_\_\_\_  
D.S. APPROVAL OF O.D.  
DIMS.

MLJ 12/06/26

MLJ 12/06/26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Page 1

Thursday, September 15, 2011 3:57:43 PM

Work Order ID: 73806



Parent Item: D350-748-201



Parent Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011

Required Date: 10/6/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: A New Issue 06-07-05 JLM  
 IPP Rev: B Update qty of MS21042L5 06-09-12 KJ  
 IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD  
 IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC  
 IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F  
 10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D350-748-241TRN

Manufactured

No

110

Each

9.0000

1



Crosstube Turning Detail



12-6-7

Location	Loc Qty	Loc Code
----------	---------	----------

LG 83288 8

61314 0

61315 0

68838 1

68839 1

68841 1

70654 1

72330 1

72331 1

72332 1

72333 1

LG003 1

68840 1

ALS4-1032-225

Purchased

No

200

Each

1,895.000

1



Insert



12 06 24

Location	Loc Qty	Loc Code
----------	---------	----------

ST282 1895

110768 62

117717 9

118386 860

118696 964

118520



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Thursday, September 15, 2011 3:57:43 PM

Work Order ID: 73806



Parent Item: D350-748-201



Parent Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011

Required Date: 10/6/2011

Start Qty: 1.00

Required Qty: 1.00

AN960JD10 NAS1149D0363J Purchased No

200 Each

0.0000

1

1



Washer

121524



12 08 24

D2856-400

Manufactured No

200

f

208.9845

1.181

1.243158



12 08 24

Abraison Strip

## Location

## Loc Qty

## Loc Code

ST403

0.3149

68076

0.3149

ST409

208.6696

63735

0.6696

71164

208

81875

1- cut as per dwg D2856

D3502-1

Manufactured No

200

Each

43.0000

2

2



12 08 24

Support

## Location

## Loc Qty

## Loc Code

ST063

43

61206

7

64004

10

68951

12

72129

14

77041

MS21920-20

Purchased

No

200

Each

74.0000

2

2



12 08 24

Clamp (per MIL-DTL-8783C)

## Location

## Loc Qty

## Loc Code

LG050

74

116799

10

118236

18

118649

46

121274

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Thursday, September 15, 2011 3:57:43 PM

Work Order ID: 73806

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011

Required Date: 10/6/2011

Start Qty: 1.00

Required Qty: 1.00

MS27039-1-10

Purchased

No

200

Each

295.0000

1

1



Screw



12 06 24

122027

## Location

## Loc Qty

## Loc Code

ST290

95

117441

95

ST291

200

118612

200

AN4-41A

Purchased

No

220

Each

309.0000

8

8



Bolt



1119328 SD

## Location

## Loc Qty

## Loc Code

ST360

309

115108

34

115705

50

116191

50

117619

50

117795

25

118451

50

118838

50

AN4-6A

Purchased

No

220

Each

1,216.000

16

16



Bolt



1119017 SD 10/6/25

## Location

## Loc Qty

## Loc Code

ST356

1200

117872

200

118422

300

118628

400

118838

300

ST358

16

117514

16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Thursday, September 15, 2011 3:57:43 PM

Work Order ID: 73806

Parent Item: D350-748-201

Parent Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011

Required Date: 10/6/2011

Start Qty: 1.00

Required Qty: 1.00

AN5-32A Purchased No 220 Each 172.0000 4 4



Bolt



M119862 D

Location	Loc Qty	Loc Code
ST339	50	
118628	50	
ST340	122	
117161	1	
117872	60	
118191	11	
118422	50	

AN960JD416 NAS1149D0463J Purchased No 220 Each 0.0000 32 32



Washer



M121912 D

AN960JD516 NAS1149D0563J Purchased No 220 Each 0.0000 8 8



Washer



M119546 D

D3500-1 Manufactured No 220 Each 16.0000 4 4



Saddle



B78595 B76940 12/6/25 SP

Location	Loc Qty	Loc Code
ST424	9	
66127	9	
ST424/25	7	
62207	7	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Thursday, September 15, 2011 3:57:44 PM

Work Order ID: 73806



Parent Item: D350-748-201



Parent Item Name: Crosstube Installation, High Aft

Start Date: 9/15/2011

Required Date: 10/6/2011

Start Qty: 1.00

Required Qty: 1.00

D3501-1 Manufactured No

220 Each

245.0000

16 16



Bushing



Location

Loc Qty

Loc Code

ST063

202

68939

102

70682

100

ST066

43

67757

43

MS21042L4

Purchased No

220 Each

3,501.000

24 24



Nut



Location

Loc Qty

Loc Code

ST300

3501

117441

51

117601

637

117885

813

118451

2000

MS21042L5

Purchased No

220 Each

1,295.000

4 4



Nut



Location

Loc Qty

Loc Code

ST300

1295

116105

5

116548

53

117441

351

117611

90

118179

496

118910

300



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 83288
<b>Description:</b> Crosstube Assembly (AS350/355 High Aft)		<b>Part Number:</b> D350-748-241
<b>Inspection Dwg:</b> D350-748-241 <b>Rev:</b> F		<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.245	✓		VERN	CNC-08
	2.180	+0.005/-0.000	2.180	✓			
	2.180	+0.005/-0.000	2.182	✓			
	2.208	+0.005/-0.000	2.207	✓	✓		
	2.234	+0.005/-0.000	2.234	✓			
	2.253	+0.005/-0.000	2.248	✓	✓		
	2.272	+0.005/-0.000	2.267	✓	✓		
	2.299	+0.005/-0.000	2.294	✓	✓		
	0.063	+/-0.010	.063	✓		RL	
	4.26	+/-0.030	4.26	✓		RL	
	R0.063	+/-0.010	.063	✓		RL	
	R0.50	+/-0.030	.5	✓		RL	
SIDE B	2.240	+0.005/-0.000	2.234	✓	✓	VERN	CNC-08
	2.180	+0.005/-0.000	2.181	✓			
	2.180	+0.005/-0.000	2.177	✓	✓		
	2.208	+0.005/-0.000	2.206	✓	✓		
	2.234	+0.005/-0.000	2.235	✓			
	2.253	+0.005/-0.000	2.251	✓	✓		
	2.272	+0.005/-0.000	2.267	✓	✓		
	2.299	+0.005/-0.000	2.300	✓			
	0.063	+/-0.010	.063	✓		RL	
	4.26	+/-0.030	4.26	✓		RL	
	R0.063	+/-0.010	.063	✓		RL	
	R0.50	+/-0.030	.50	✓		RL	
	122.70	+/-0.060	122.7	✓		TAPE	MM-02

<b>Measured by:</b>		<b>Audited by:</b>		<b>Preliminary Approval:</b>	
<b>Date:</b>		<b>Date:</b>		<b>Date:</b>	

Rev	Date	Change	Revised by	Approved
A	07.01.17	New Issue (P/O D350-748-201)	KJ/JLM	
B	12.02.02	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

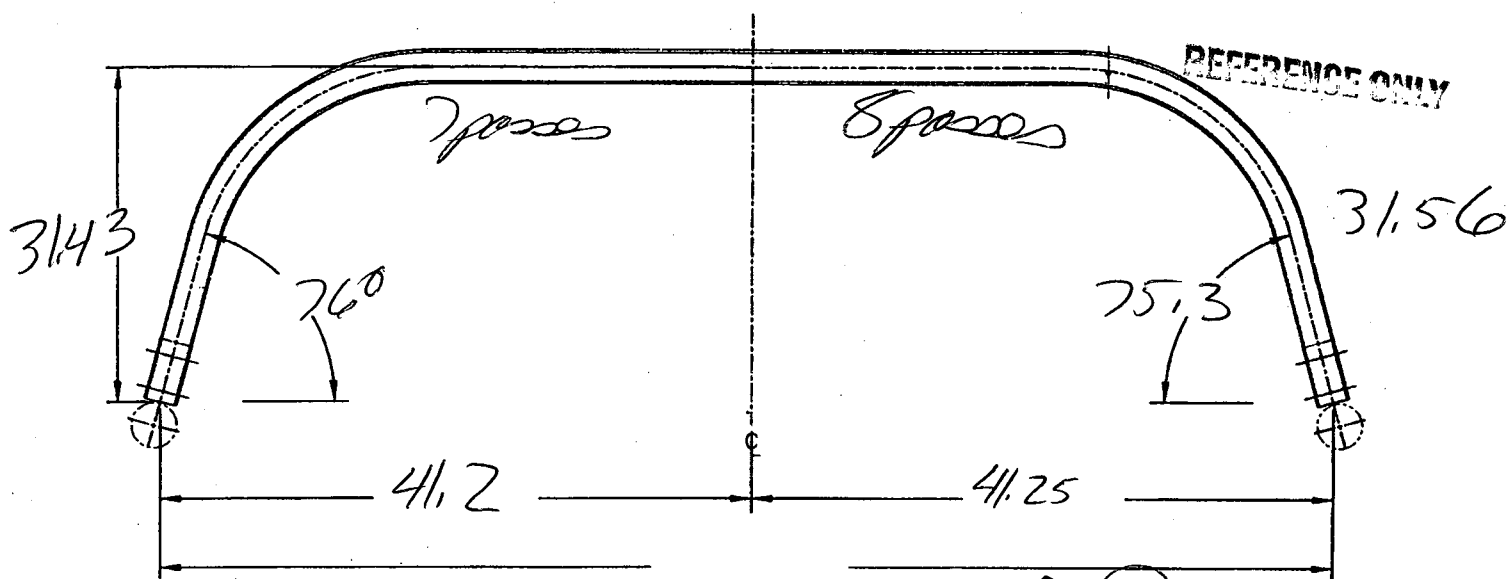
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 73806
<b>Description:</b> Crosstube High Aft (AS350/355)		<b>Part Number:</b> D350-748-201
<b>Inspection Dwg:</b> D350-748-241 <b>Rev:</b> E		<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	<i>[Signature]</i>



Item	Qty -241	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125  
FINISHED LENGTH = 122.700±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2  
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF  
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 29.85 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING  
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER  
BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO  
BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO  
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,  
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,  
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.  
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE  
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO  
CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT  
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN  
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

RELEASED  
2011-01-08

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.11.23		

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. REV. F  
D350-748-241 SHEET 1 OF 4  
TITLE SCALE  
CROSSTUBE (AS 350/355 HI AFT) NTS

COPYRIGHT © 2006 BY DART AEROSPACE LTD  
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS  
NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT  
WRITTEN PERMISSION FROM DART AEROSPACE LTD.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

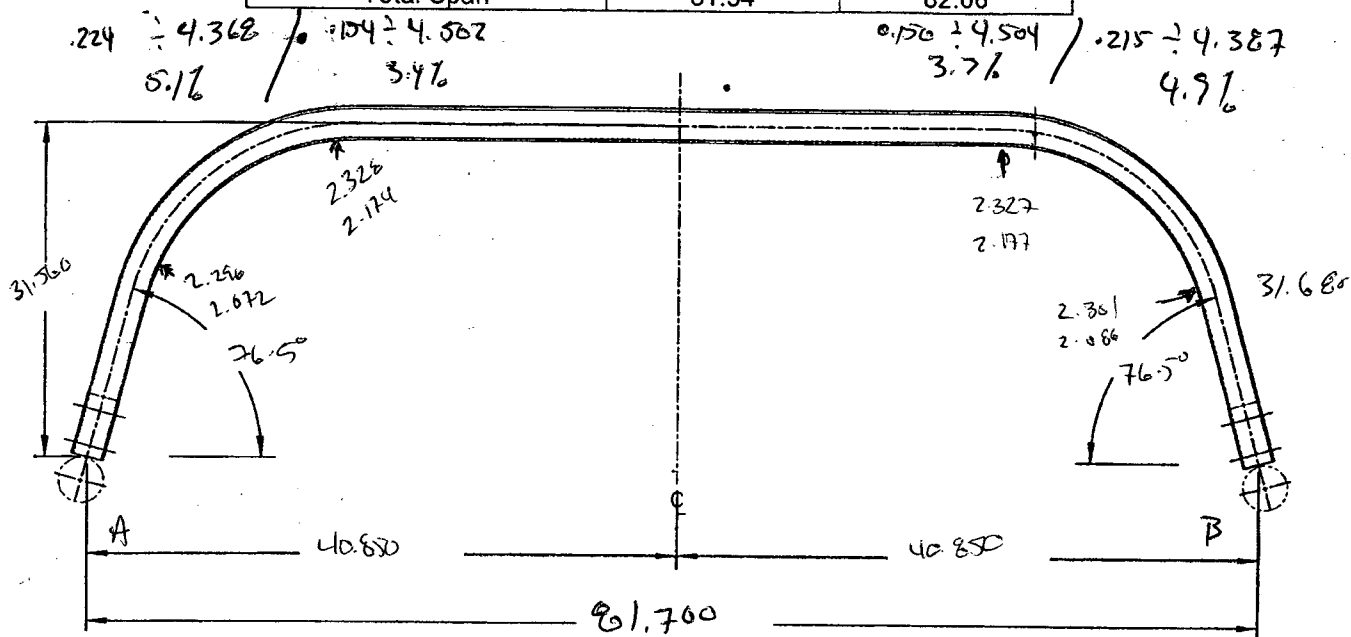
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	738004
Description: Crosstube High Aft (AS350/355)		Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Comments
twist 20.608
Side A = 5.1% Bottom of Bend / 3.4% top END of Bend
Side B = 4.9% Bottom of Bend / 3.3% top END of Bend

Acceptable  
 12.06.09  
 PSI 642

QC15 Inspection	12.06.25
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	



8 7 6 5 4 3 2 1

D

C

B

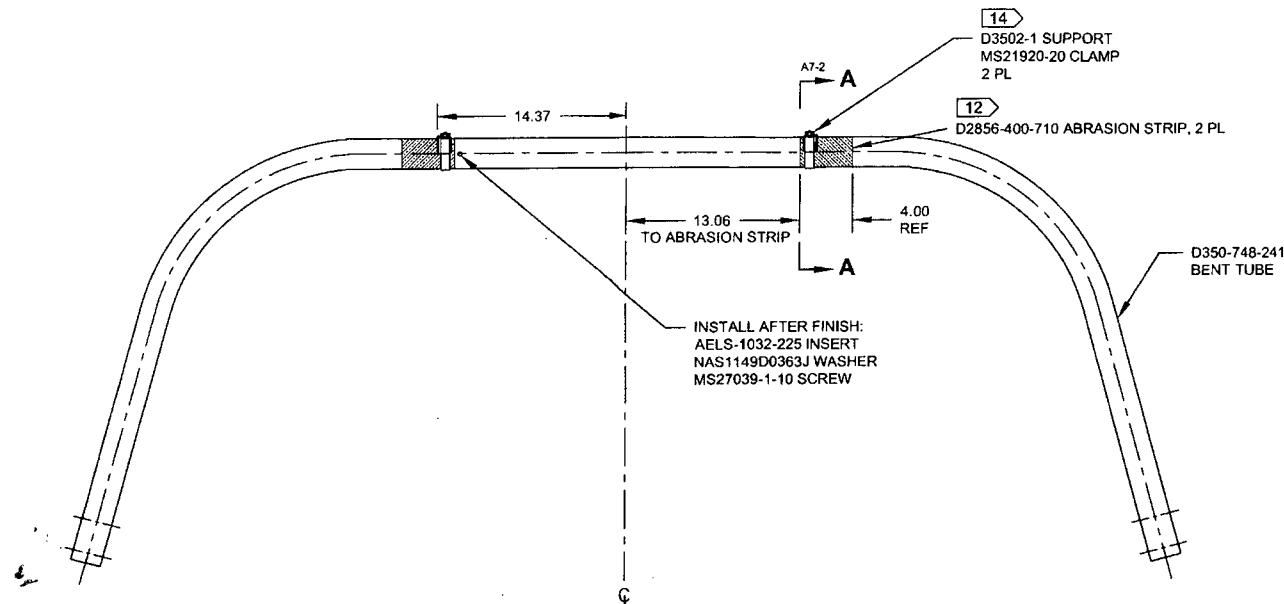
A

D

C

B

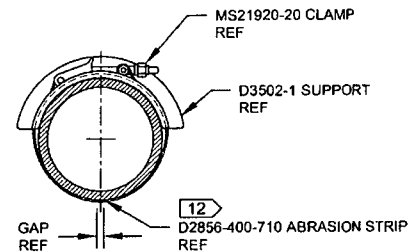
A



**D350-748-241  
ASSEMBLY DETAIL**

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO 73806  
R11-09-15

**RELEASED**  
2011-03-19  
JMP



**SECTION A-A** D4-2  
SCALE 4X

DESIGN	GP	<b>DART AEROSPACE LTD</b>	
DRAWN	GP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	GP	DRAWING NO.	REV. F
MFG. APPR.	GP	D350-748-241	SHEET 2 OF 4
APPROVED	GP	TITLE	SCALE
DE APPR.	GP	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

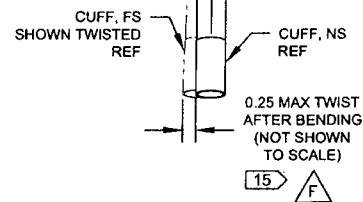
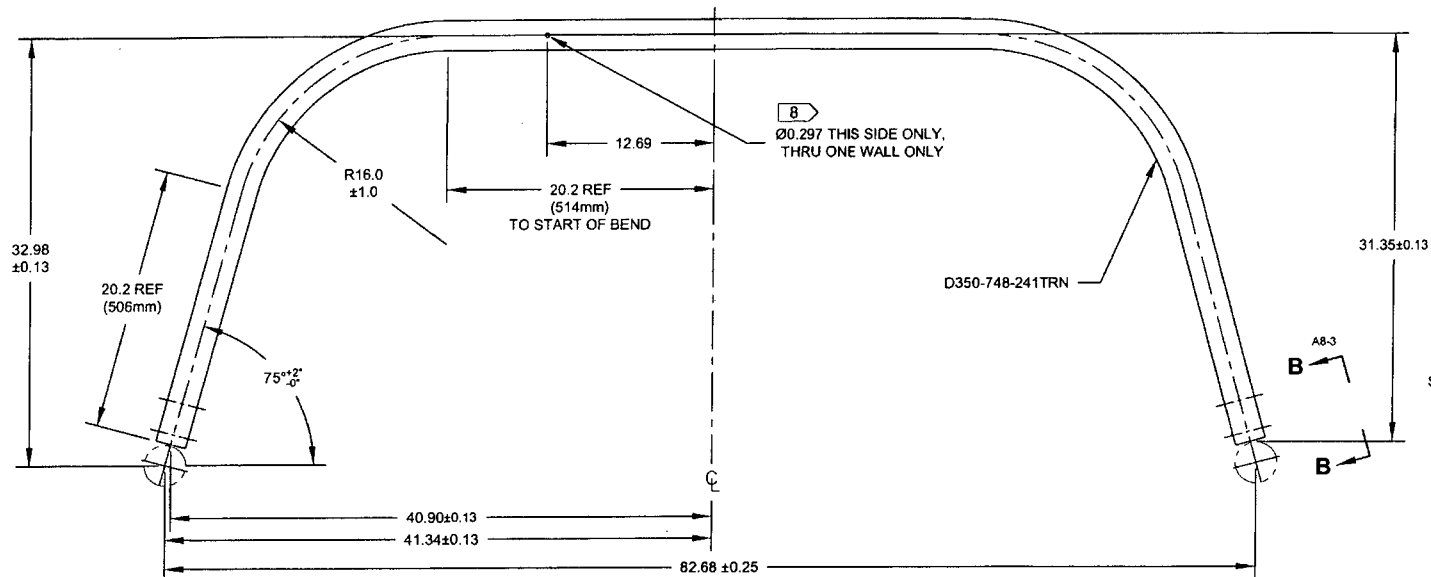
8 7 6 5 4 3 2 1

D

C

B

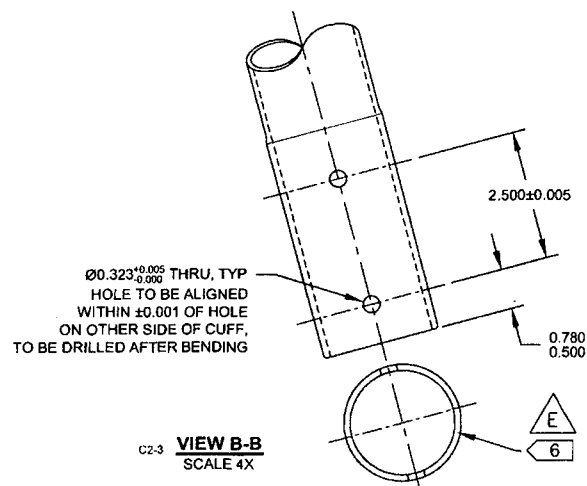
A



**D350-748-241**  
**BENDING AND DRILLING DETAIL** 10

**RELEASED**  
2011-01-18

73806



C2-3 **VIEW B-B**  
SCALE 4X

8 7 6 5 4 3 2 1

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN	qp	HAWKESBURY, ONTARIO, CANADA	
CHECKED	qp	DRAWING NO.	REV. F
MFG. APPR.		D350-748-241	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

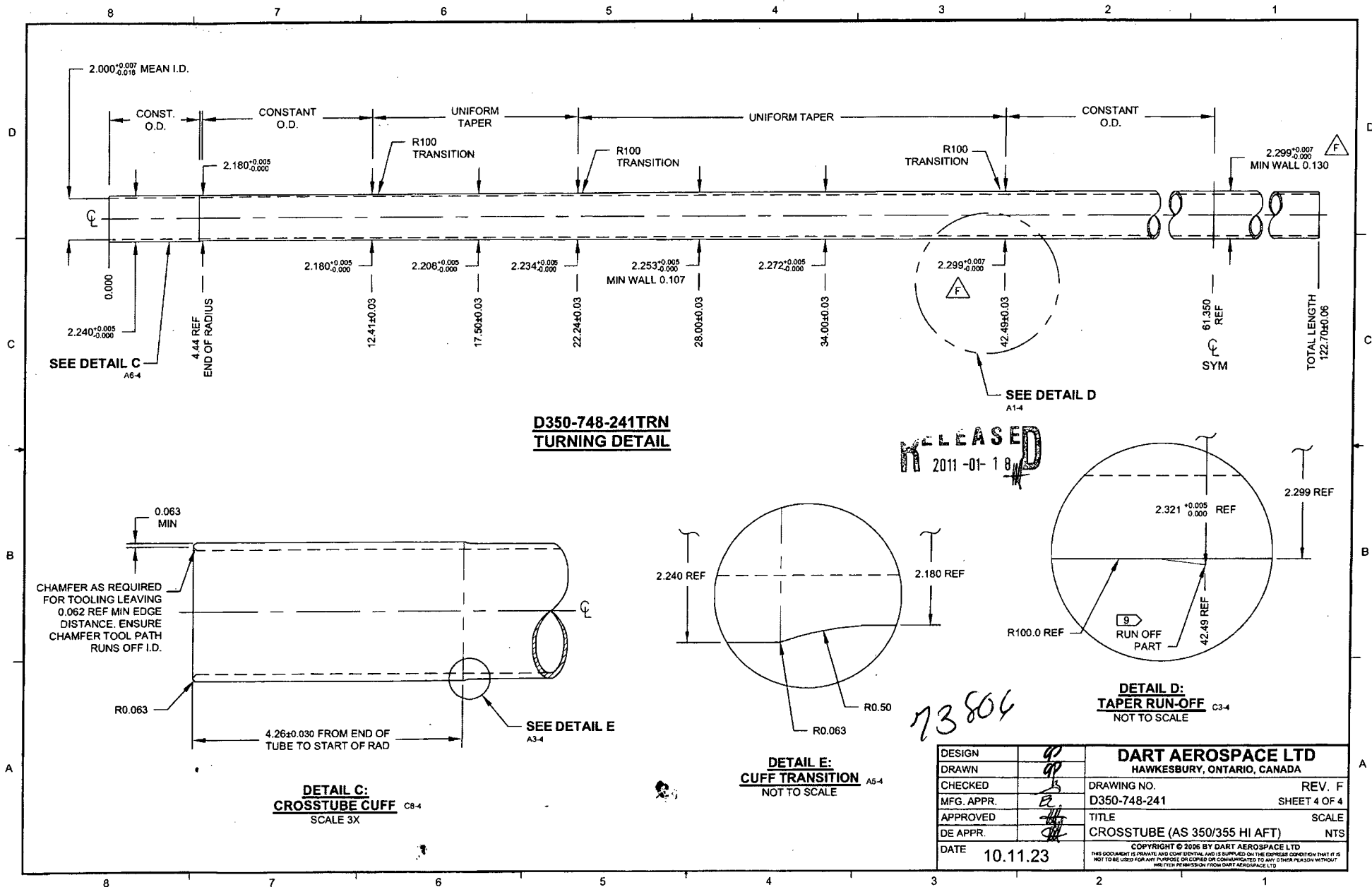
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# METCOR INC.

560 BOUL. ARTHUR-SAUVÉ  
ST-EUSTACHE, QC J7R 5A8  
Tel: 450-473-1884 / Fax: 450-491-5498

## Recu de Livraison

Order	Shipper	Shipping Seq.
176670	1	61651

Shipped Complete

Customer **215**

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
Ph: 613-632-5200  
Fax: 613-632-1052

Shipped To:

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
Ph: 613-632-5200  
Fax: 613-632-1053

Purchase Order Number	Customer Shipper No.	Material Type	Order Date	Carrier
PO17159		Steel	2012/6/7	PICK UP
Quantity	Part No. / Part Name / Part Description			Pounds
5	D350-748-301 CONTENANT: 1 PALETTE			150,

Container Type	# Of Containers	Container Comments
PALETTE	1	

CERTIFICAT

<b>PACKING</b>	
----------------	--

Quantity Shipped: 5  
Pounds Shipped: 150,00  
Quantity Remaining: 0  
Pounds Remaining: 0,00

CERTIFICAT

Quantity Shipped: 5

Pounds Shipped: 150,00

Signature:

Date:

# METCOR INC.

560 BOUL. ARTHUR-SAUVÉ  
ST-EUSTACHE, QC, J7R 5A8

Tel: 450-473-1884 / Fax: 450-491-5498

## Certificat de Conformité Détaillé Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
176670	1

CLIENT / customer 215

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY

ON K6A 1K7

1

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
PO17159		Steel		

### SPÉCIFICATIONS DU PROCÉDÉ processing specifications

STRESS REL

SAE AMS 2759/1 REV.E

EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results  
Visual

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
5	150	D350-748-201 (1) CROSSTUBE REFERENCE: 73806  (1) D350-748-201 CROSSTUBE REFERENCE: 73808  (1) D350-748-201 CROSSTUBE REFERENCE: 73809  (1) D350-748-201 CROSSTUBE REFERENCE: 85335  (1) D350-748-201 CROSSTUBE REFERENCE: 85402  CONTENANT: 1 PALETTE

Operation	Temp. Spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphère	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
1.00 CONT. INIT.	LAVAGE		si nécessaire							



# METCOR INC.

560 BOUL. ARTHUR-SAUVÉ  
ST-EUSTACHE, QC, J7R 5A8

Tel: 450-473-1884 / Fax: 450-491-5498

## Certificat de Conformité Détaillé

Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
176670	1

CLIENT / customer 215

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE  
1270 ABERDEEN  
HAWKESBURY

1

ON K6A 1K7

Operation	Temp. spécifiée Specified Temp	Temps de trempage Spécifié Specified Soak Temp	Atmosphère	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
2.00 PREPARING	COMPTAGE									
3.00 STRESS RE	343 +/-25°C	2:30 hrs	air			701				
4.00 FINAL INSP							06-08-2012			06-08-2012

### COMMENTAIRES / comments

ALL THE HEAT TREATMENT PROCESSING PERFORMED ON THIS ORDER WAS ACCOMPLISHED USING HEAT TREATMENT EQUIPMENT THAT MEETS THE REQUIREMENTS OF AMS 2759. ALL THE HEAT TREATMENT OPERATIONS WERE ACCOMPLISHED IN ACCORDANCE WITH THE REQUESTED/REQUIRED HEAT TREATMENT SPECIFICATION AND ALL REQUIRED VERIFICATIONS TEST HAVE BEEN PERFORMED AND DOCUMENTED. NO UNAUTHORIZED CHANGES OR DEVIATIONS TO REQUIRED HEAT TREATMENT SPECIFICATIONS OR PROCEDURES HAVE BEEN PERFORMED.

APPROUVÉ par / Approved by:

*[Signature]*



DATE: 2012-06-08

/ Nous certifions que toute l'information comprise sur ce rapport est exacte et conforme aux requis du client./We certify that all the information on this report is exact and in accordance with the order requirements.



**CERTIFICATE OF  
CONFORMANCE**

**CADORATH PLATING CO. LTD.  
2150 LOGAN AVENUE  
WINNIPEG, MANITOBA R2J-0J1**

**DATE:** Jun-20-2012

**CONSIGNED TO:** Dart Aerospace Ltd.  
1270 Aberdeen St.  
Hawksbury, ON K6A 1K7

**W/O #:** 115264

**INVOICE #:** 60974

**CONTRACT OR  
PURCHASE ORDER #** PO17184

**DESCRIPTION:** CROSSTUBE

**QTY** 1

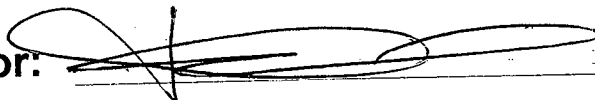
**P/N #** D350-748-201

**S/N #** 73806

STRESS RELIEF BAKE HEAT CHART # 12-589. MPI IAW ASTM-E-1444. CADMIUM PLATE IAW AMS-QQ-P-416C TYPE 2 YELLOW CLASS 2. BAKE HEAT CHART #12-604. MPI IAW ASTM-E-1444.

**CERTIFICATE:** I certify that the items indicated here on have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

**Approved Inspector:**





## LIQUID PENETRANT TEST REPORT

P- 12189

CLIENT DART AERO SPACE DATE JUNE 27/2012 PAGE 1 OF 1  
ATTENTION LINDA / MATT ACUREN JOB NO. 188-12-CO270 TIME AM ☒ PM ☐  
ADDRESS 1270 A BENDEN ST. POWO NO. -  
HAWKESBURY, ON. WORK LOCATION SAME  
ACCEPTANCE STD. ASTM 1417/PSI-038 REV./DATE 2005  
PROJECT F.P.I. ON CROSS TUBES  
ITEM(S) EXAMINED 2 PCS

JOB DESCRIPTION PROCEDURE NO. LT 0002 REV./DATE 2008 TECHNIQUE NO. LT 1417 REV./DATE 2008  
PART NO. SEE RESULTS MATERIAL STEEL / ALUMINUM THICKNESS VARIOUS  
SCOPE A JET FLOUORESCENT PENETRANT INSPECTION WAS CARRIED OUT ON THE EXTERNAL SURFACE 100%

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 18059 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT < 2 fc  
PENETRANT 2LG7 MINIMUM DWELL TIME 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER 1020 MINIMUM DRY TIME > 10 MIN. OTHER LABINO  
DEVELOPER SK052 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE JULY 28/2012  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☒ METRIC ☐ IMPERIAL)

ITEM	W.O. #	COMMENTS	ACCEPT	REJECT
1	85335	" "	✓	
1	73809	" "	✓	
1	85402	" "	✓	
1	73808	" "	✓	
1	73806	" "	✓	
1	84184	" "	✓	
1	84185	" "	✓	
1	84527	" "	✓	
1	84526	" "	✓	

STEEL TUBES  
ALUMINUM TUBES

Scope of Services  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion, reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES  
CLIENT REPRESENTATIVE Andy Sheldon PRINT Alsheldon SIGNATURE DTR # E-63661  
TECHNICIAN (SIGNATURE): Mike Hansen REPORT REVIEWED BY:  
NAME (PRINT): 1<sup>ST</sup> TECHNICIAN 2<sup>ND</sup> TECHNICIAN  
CGSB LEVEL II SNT LEVEL II CGSB LEVEL II SNT LEVEL II  
CGSB REG. NO. 6606 CGSB REG. NO. 6606

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY